

REMARKS/ARGUMENTS

Claims 1-44 were pending in the present application and have been supplemented by claims 45-47. In the Office Action of 06/26/2009, claims 30-44 were rejected under §101. Claims 1, 6-11 and 23-27 were rejected under §102(e). The remaining claims were rejected under §103(a).

Before addressing the issues raised in the Office Action, Application notes that the prior pending claims included some claim elements that may have been confusing or unclear and, thus, resulted in the fairly substantial amount of prior art identified in the Office Action. Applicant hereby presents a variety of amendments that seek to clarify the claimed invention. As will be described below, by way of these amendments, the art of record is no longer germane and, thus, the rejections based on the art of record are hereby traversed.

Turning to the present invention, as described in the Background section of the present application, tomographic images often suffer from artifacts. These artifacts can take numerous forms and can be caused by a plethora of mechanisms and combinations of mechanisms. To name but a few, tomographic images can suffer from beam-hardening artifacts, bloom artifacts, and artifacts caused by missing data. Though not identified in the cited sections of the prior art, simply decomposing tomosynthetic image data into a set of uniform "volume segments" for independent reconstruction via parallel processing results artifacts. Not only did the present inventors correctly identify that decomposing tomosynthetic image data into a set of uniform "volume segments" causes artifacts, the inventors further identified that the artifacts were caused by underdetermined peripheral regions that cause artifacts. Further still, the present inventors correctly identified that these underdetermined peripheral regions were due to the mismatch of volume coverage between projection images acquired at different angles. Upon all of these realizations, the present inventors invented a way to overcome these numerous problems and, thereby, avail tomographic image reconstruction of the benefits of parallel processing without the injection of these undesirable artifacts as a tradeoff for the speed of parallel processing.

In particular, to speed up image reconstruction while avoiding these artifacts, the present invention decomposes the acquired image data into volume segments with overlapping volume coverage. The volume segments are then reconstructed to produce reconstructed volume segments, each with a "good" central region and an

undetermined peripheral region whose volume coverage overlaps that of a neighboring reconstructed volume segment's central region. Thus, an overall image of the subject without reconstruction artifacts is produced by merging the central regions of the reconstructed volume segments.

To this end, claim 1, for example, calls for:

acquiring projection data from the target volume over a limited plurality of angles using an imaging system;

segmenting the acquired projection data into a plurality of partially overlapping volume segments such that neighboring volume segments each include projection data corresponding to the partially overlapping volume segments;

applying a reconstruction algorithm to each volume segment to generate a plurality of reconstructed volume segments, each of the plurality of reconstructed volume segments including a central region and an underdetermined peripheral region; and

merging the central regions of each reconstructed volume segment to produce the three-dimensional image of the target volume.

Nowhere does the prior art of record teach or suggest a method that includes acquiring projection data, segmenting the data into a plurality of partially overlapping volume segments, applying a reconstruction algorithm to each volume segment to generate a plurality of reconstructed volume segments including a central region and an underdetermined peripheral region, and then merging the central regions to create the image. For at least these reasons, claims 1 and 16 are patentable distinct from the art of record. Accordingly, claims 2-9, 17-23, 25, 26, and 45-47 are patentably distinct from the art of record at least pursuant to the chain of dependency. However, Applicant notes that these dependent claims include additional subject matter that is further distinguishable from the art of record. Finally, Applicant notes that claims 10-15, 24, and 27-44 have been canceled without prejudice.

The Commissioner is authorized to charge any fees under 37 CFR § 1.17 that may be due on this application to Deposit Account 17-0055. The Commissioner is also authorized to treat this amendment and any future reply in this matter requiring

Amendment
MGH 00199
"Multi-Segment Cone Beam Reconstruction for Tomosynthesis Imaging"

a petition for an extension of time as incorporating a petition for extension of time for the appropriate length of time as provided by 37 CFR § 136(a)(3).

Respectfully submitted,

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